



IFW

**PATENT APPLICATION**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Confirmation No.: 3293

MARUYAMA et al.

Examiner: A. Mai

Application No.: 09/856,139

Art Unit: 2814

Filed: May 29, 2001

Attorney Dkt. No.: 107242-00017

For: WAFER AND EPITAXIAL WAFER, AND MANUFACTURING PROCESSES  
THEREFOR

**RESPONSE TO COMMUNICATION**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

May 8, 2007

Sir:

In the Communication dated April 26, 2007, the Patent Office indicated that Applicants' Supplemental Appeal Brief filed on February 27, 2006, which replaced the Appeal Brief that was previously-filed on January 4, 2005, had been entered.

However, the Communication also indicated that the Evidence Appendix added a document that had never been properly introduced during the prosecution of the application. This statement is incorrect.

The document contained in the Evidence Appendix consists of a Japanese-language pamphlet for a boron-free ULPA filter that is referred to in Applicants' specification, and the English translation of that pamphlet. The document was properly submitted during prosecution of the present application as an attachment to the Response under 37 C.F.R. § 1.116 that was filed on September 7, 2004. In the Advisory Action dated September 30, 2004, the Examiner indicated that the response had been entered and considered, but did not place the application in condition for allowance.

As evidence of the fact that the Japanese-language pamphlet and the English translation of that pamphlet were properly submitted during prosecution of the application, and were entered into the prosecution file, Applicants are attaching hereto a PTO date-stamped copy of the document (Exhibit A). This document was downloaded from the PTO's PAIR system. The document was not imaged separately as an NPL document, but was instead imaged as part of the September 7, 2004 "Applicant Arguments/Remarks Made in an Amendment," and is found at pages 7-11 of that document. See highlighted copy of "Available Documents" on PAIR for this application (Exhibit B).

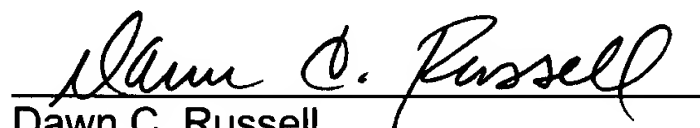
Applicants therefore submit that the evidence was properly submitted prior to the filing of the Appeal Brief in accordance with 37 C.F.R. § 41.37(c)(1)(ix).

**Applicants respectfully request that the evidence submitted in the Evidence Appendix of the Supplemental Appeal Brief be entered and considered during the Appeal.**

No fees are believed due in connection with the filing of this paper, however, the Commissioner is hereby authorized to charge any fee deficiencies required with respect to this paper, or overpayment to our Deposit Account No. 01-2300, **referencing docket number 107242-00017.**

Respectfully submitted,

ARENT FOX LLP



Dawn C. Russell

Attorney for Applicants

Registration No. 44,751

Attachments:    Exhibit A  
                     Exhibit B

Customer No.: **004372**

1050 Connecticut Avenue, N.W.  
Washington, D.C. 20036-5339  
Telephone No.: 202-857-6000  
Facsimile No.: 202-857-6395

DCR:sg



## Analysis of the metallic ingredient of filter medium

### I. Purpose

- (1) Checking types and amounts of the metallic elements contained in filter medium.
- (2) Checking the metallic elements that become a subject of discussion in the process of manufacturing a semiconductor, such as Boron, Phosphorus, do not generate.
- (3) Checking the possible elements that may be generated, by means of the qualitative analysis and the quantitative analysis of the small amount of elements that cannot be detected by GC-MS (Gas Chromatography Mass Spectrometer).

### II. Testing method

After crushing a test sample into the fragments and resolving the fragments by sulfuric acid and nitric acid, the qualitative analysis and the quantitative analysis of elute was carried out by means of ICP-OES (Inductively Coupled Plasma Optical Emission Spectroscopy). A PTFE (Poly Tetra Fluoro Ethylene) complex film filter medium was fully resolved, but numerical values of a glass filter medium were only for elution because the glass filter medium was not fully resolved.

### III. Result

Elements detected by the qualitative analysis and the quantitative analysis were shown in Table 1.

Table 1: The metallic elements contained in the filter medium (an example of measurement)

Unit:  $\mu\text{g/g}$

No.	Name of detected element	Detection limit	PTFE complex film filter medium	Glass filter medium
1	B (boron)	20	ND	1-10 %
2	P (phosphorus)	200	ND	ND
3	Si (silicon)	100	ND	the main

				component
4	Na (sodium)	10	ND	1-10 %
5	K (kalium)	20	ND	1,000-10,000
6	Al (aluminium)	20	ND	1,000-10,000
7	Ba (barium)	10	ND	ND
8	Ca (calcium)	2	ND	1,000-10,000
9	Fe (iron)	10	ND	10-100
10	Mg (magnesium)	10	ND	10-100
11	Sb (antimon)	100	100-1,000	ND
12	Sr (strontium)	2	ND	10-100
13	Ti (titanium)	10	1,000-10,000	10-100
14	Zn (zinc)	10	ND	100-1,000

\* ND (Not Detected) : below detection limit value

## VI. Observations

(1) The metallic elements that become a subject of discussion in the process of manufacturing a semiconductor, such as Boron, Phosphorus, did not generate from the PTFE complex film filter medium. Thus, the PTFE complex film filter medium does not contain the above elements.

(2) The metallic elements contained in the PTFE complex film filter medium is much less than that contained in the glass filter medium.

### Ultrapure water elution test of filter medium

#### I. Purpose

(1) In a clean room used in the technical field of semiconductor or liquid crystal, contamination from each of the members provided in the clean room by the small amount of gas is a problem. Specifically, boron, which is generated from a filter medium of glass fiber, or volatile organic material, which is generated from a variety of resins, is the problem.

Accordingly, I checked the amount of metallic content eluted into ultrapure water by carrying out an elution test into ultrapure water of a filter medium used in the boron-free filter.

## II. Testing method

After immersing a PTFE complex film filter medium (200 x 200 mm) and a glass filter medium (200 x 200 mm) into ultrapure water (80 ml) for three days, eluted metallic content was measured by ICP-MS (Inductively Coupled Plasma Mass Spectrometry).

## III. Result

Elements detected by the measurement were shown in Table 1.

Table 1: The amount of eluted metallic content from the filter medium

Unit: ng/ml (ppb)

No.	Name of detected element	PTFE complex film filter medium	Glass filter medium
		Measured value	Measured value
1	Na (sodium)	20	6000
2	K (kalium)	13	1000
3	Mg (magnesium)	1	70
4	Ca (calcium)	20	500
5	Sr (strontium)	ND	7
6	Ba (barium)	ND	80
7	Ti (titanium)	ND	0.3
8	Fe (iron)	3	8
9	Zn (zinc)	2	80
10	B (boron)	ND	2000
11	Al (aluminium)	ND	20
12	Sb (antimon)	ND	0.3

\* ND (Not Detected) : below detection limit value

## VI. Observations

(1) The metallic elements that become a subject of discussion in the process of manufacturing a semiconductor, such as Boron, Phosphorus, silicon did not generate from the elute.

## ろ材の金属成分分析

### 1. 目的

- (1)ろ材に含まれる金属元素の種類と量を確認しました。
- (2)半導体製造工程で問題となっている B、P といった金属元素が発生していないことを確認しました。
- (3)GC-MS では、検出しない微量金属の定性・定量を行い発生する可能性のある元素を確認しました。

### 2. 試験方法

試験体を細かく粉砕した後、硫酸及び硝酸により分解した液を ICP 発光分光法により定性分析(Li～Bi)及び半定量分析をしました。PTFE 複合膜ろ材は全分解しましたが、ガラスろ材は、全分解していないため溶出分のみの値となっています。

### 3. 結果

定性・半定量分析により検出された元素について表 1 にまとめました。

表 1 ろ材に含まれる金属元素 (測定の一例)

単位:  $\mu\text{g/g}$

No	検出元素名	検出限界	PTFE 複合膜ろ材	ガラスろ材
1	B (ホウ素)	20	ND	1～10%
2	P (リン)	200	ND	ND
3	Si (ケイ素)	100	ND	主成分
4	Na (ナトリウム)	10	ND	1～10%
5	K (カリウム)	20	ND	1,000～10,000
6	Al (アルミニウム)	20	ND	1,000～10,000
7	Ba (バリウム)	10	ND	ND
8	Ca (カルシウム)	2	ND	1,000～10,000
9	Fe (鉄)	10	ND	10～100
10	Mg (マグネシウム)	10	ND	10～100
11	Sb (アンチモン)	100	100～1,000	ND
12	Sr (ストロンチウム)	2	ND	10～100
13	Ti (チタン)	10	1,000～10,000	10～100
14	Zn (亜鉛)	10	ND	100～1,000

注) ND : 検出限界以下

### 4. 考察

- (1)PTFE 複合膜ろ材からは半導体製造工程で問題となる B、P、Si と云った無機系の元素は、検出されませんでした。よって、PTFE 複合膜ろ材は、これらの元素を含有していません。
- (2)PTFE 複合膜ろ材の含有金属元素量は、ガラスに比べ非常に少なくなっています。

以上

## ろ材の超純水溶出試験

### 1. 目的

半導体・液晶等の分野のクリーンルームにおいて、各種部材から発生する微量ガスによる汚染が問題となっています。特にガラス繊維ろ材を用いたフィルタからの発生するボロンや、各種樹脂から発生する揮発性有機物質は問題となっています。

そこで、ボロンフリーフィルタのろ材の超純水中への溶出試験を行い、溶出金属成分量を確認しました。

### 2. 試験方法

200×200mmのPTFE複合膜とガラスろ材を80mlの超純水中に3日間浸漬し、溶出した金属成分をICP-MSで測定しました。

### 3. 結果

測定により検出された元素について表1にまとめました。

表1 ろ材からの溶出金属量

単位：ng/ml (ppb)

No	検出元素名	PTFE複合膜	ガラスろ材
		測定値	測定値
1	Na (ナトリウム)	20	6000
2	K (カリウム)	13	1000
3	Mg (マグネシウム)	1	70
4	Ca (カルシウム)	20	500
5	Sr (ストロンチウム)	ND	7
6	Ba (バリウム)	ND	80
7	Ti (チタン)	ND	0.3
8	Fe (鉄)	3	8
9	Zn (亜鉛)	2	30
10	B (ボロン)	ND	2000
11	Al (アルミニウム)	ND	20
12	Sb (アンチモン)	ND	0.3

注：ND：検出限界以下

### 4. 考察

(1) PTFE複合膜ろ材の溶出液からは、半導体・液晶等製造工程で問題となるB、P、Siと云った金属元素は、検出されませんでした。

以上

09/856,139

Wafer and epitaxial wafer, and manufacturing processes therefor

05-08-

2007::10:49:22

**This application is officially maintained in electronic form. To View: Click the desired Document Description. To Download and Print: Check the desired document(s) and click Start Download.**

### Available Documents

	Document Description	Document Category	Page Count
04-26-2007	Miscellaneous Action with SSP	PROSECUTION	2
03-19-2007	Request for status of Application	PROSECUTION	1
10-06-2006	Miscellaneous Action with SSP	PROSECUTION	2
10-06-2006	List of References cited by applicant and considered by examiner	PRIOR ART	2
09-20-2006	NPL Documents	PRIOR ART	7
09-20-2006	NPL Documents	PRIOR ART	4
09-20-2006	Information Disclosure Statement (IDS) Filed	PROSECUTION	4
09-20-2006	Foreign Reference	PRIOR ART	36
09-20-2006	Foreign Reference	PRIOR ART	23
09-20-2006	Foreign Reference	PRIOR ART	28
09-20-2006	Foreign Reference	PRIOR ART	34
02-27-2006	Appeal Brief Filed	PROSECUTION	41
02-03-2006	Miscellaneous Action with SSP	PROSECUTION	2
11-14-2005	Order Returning Undocketed Appeal to the examiner from BPAI	PROSECUTION	7
08-04-2005	Reply Brief Noted - BPAI	PROSECUTION	2
05-27-2005	Reply Brief Filed	PROSECUTION	6
03-29-2005	Examiner's Answer to Appeal Brief	PROSECUTION	12
01-04-2005	Appeal Brief Filed	PROSECUTION	24
11-04-2004	Notice of Appeal Filed	PROSECUTION	2
09-30-2004	Advisory Action (PTOL-303)	PROSECUTION	3
09-07-2004	Applicant Arguments/Remarks Made in an Amendment	PROSECUTION	11
09-07-2004	Amendment After Final	PROSECUTION	1
06-04-2004	List of references cited by examiner	PRIOR ART	1
06-04-2004	Index of Claims	PROSECUTION	1
06-04-2004	Final Rejection	PROSECUTION	9
04-15-2004	Index of Claims	PROSECUTION	1
04-15-2004	Fee Worksheet (PTO-06)	PROSECUTION	1
04-06-2004	Specification	PROSECUTION	1
04-06-2004	Miscellaneous Incoming Letter	PROSECUTION	1
04-06-2004	Drawings	PROSECUTION	2
04-06-2004	Claims	PROSECUTION	13
04-06-2004	Applicant Arguments/Remarks Made in an Amendment	PROSECUTION	5
04-06-2004	Amendment - After Non-Final Rejection	PROSECUTION	1
01-15-2004	Search information including classification, databases and other search related notes	PROSECUTION	1
01-15-2004	Non-Final Rejection	PROSECUTION	7
01-15-2004	List of references cited by examiner	PRIOR ART	1
01-15-2004	List of References cited by applicant and considered by examiner	PRIOR ART	1
01-15-2004	Index of Claims	PROSECUTION	1
10-16-2003	Response to Election / Restriction Filed	PROSECUTION	2
07-16-2003	Requirement for Restriction/Election	PROSECUTION	4
05-05-2003	Response to Election / Restriction Filed	PROSECUTION	2
04-09-2003	Requirement for Restriction/Election	PROSECUTION	5
08-30-2001	Oath or Declaration filed	PROSECUTION	4



## EXHIBIT B

08-30-2001	Miscellaneous Incoming Letter	PROSECUTION	2
07-25-2001	NPL Documents	PRIOR ART	1
07-25-2001	NPL Documents	PRIOR ART	1
07-25-2001	NPL Documents	PRIOR ART	1
07-25-2001	NPL Documents	PRIOR ART	1
07-25-2001	NPL Documents	PRIOR ART	6
07-25-2001	Information Disclosure Statement (IDS) Filed	PROSECUTION	3
07-17-2001	Notice of DO/EO Acceptance Mailed	PROSECUTION	1
05-29-2001	Transmittal of New Application	PROSECUTION	2
05-29-2001	Specification	PROSECUTION	39
05-29-2001	Search information including classification, databases and other search related notes	PROSECUTION	1
05-29-2001	Oath or Declaration filed	PROSECUTION	5
05-29-2001	NPL Documents	PRIOR ART	4
05-29-2001	Miscellaneous Incoming Letter	AS FILED	80
05-29-2001	Issue Information including classification, examiner, name, claim, renumbering, etc.	PROSECUTION	1
05-29-2001	Index of Claims	PROSECUTION	1
05-29-2001	Foreign Reference	PRIOR ART	4
05-29-2001	Foreign Reference	PRIOR ART	5
05-29-2001	Foreign Reference	PRIOR ART	5
05-29-2001	Fee Worksheet (PTO-06)	PROSECUTION	1
05-29-2001	Fee Worksheet (PTO-06)	PROSECUTION	1
05-29-2001	Drawings	PROSECUTION	13
05-29-2001	Documents submitted with 371 Applications	PROSECUTION	60
05-29-2001	Claims Worksheet (PTO-2022)	PROSECUTION	1
05-29-2001	Claims	PROSECUTION	6
05-29-2001	Claims	PROSECUTION	12
05-29-2001	Applicant Arguments/Remarks Made in an Amendment	PROSECUTION	1
05-29-2001	Amendment - After Non-Final Rejection	PROSECUTION	1
05-29-2001	Abstract	PROSECUTION	1
05-29-2001	Abstract	AS FILED	1
03-29-2001	Certified Copy of Foreign Priority Application	PROSECUTION	50

---

**Close Window**